STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY
ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 942360001
(916) 653-5791

MAY 0 1 2009

TO: Distribution List

Attached is the third report to the Chairs of the Senate and Assembly fiscal committees on the Department of Water Resources' (DWR) energy use and purchasing activities. This is a supplemental report required by the 2007 Budget Act (Item 3860-001-0001), dated August 2007.

The report discusses the energy related activities of DWR's State Water Project, the California Energy Resources Scheduling Division, and the Office of Water Use Efficiency and Transfers related to its statutory and regulatory authority and disbursement of bond funds.

If you have any questions, please contact me at (916) 653-7007 or your staff may contact Veronica Hicks, Chief of DWR's State Water Project Power and Risk Office at (916) 574-1295.

Sincerely,

for Lester A. Snow
Director

Attachment

Distribution List

Honorable Denise Moreno Ducheny, Chair
Joint Legislative Budget Committee
1020 N Street, Room 553
Sacramento, California 95814

Attention: Ms. Peggy Collins

Mr. Mac Taylor
Legislative Analyst
Legislative Analyst Office
925 L Street, Suite 1000
Sacramento, California 95814

Mr. E. Dotson Wilson
Chief Clerk of the Assembly
State Capitol, Room 3196
Sacramento, California 95814

Mr. Gregory Schmidt
Secretary of the Senate
State Capitol, Room 400
Sacramento, California 95814

Ms. Diane Boyer-Vine
Legislative Counsel
925 L Street, Suite 900
Sacramento, California 95814

Attention: Ms. Diane Anderson

Honorable Christine Kehoe, Chair
Senate Appropriations Committee
State Capitol, Room 5050
Sacramento, California 95814

Honorable Kevin De Leon, Chair
Assembly Appropriations Committee
State Capitol, Room 2114
Sacramento, California 95814

The California Department of Water Resources
Report to the California State Legislature
Regarding its Energy Use and Purchasing Activities
January 1, 2009

The Department of Water Resources (DWR) is pleased to submit its semiannual Report to the Legislature summarizing its energy use and purchasing activities. This report is the third in the series of semi-annual reports, which addresses the actions DWR is taking to:

- Phase out the use of coal-based energy supplied from its participation agreement for the partial output of Reid Gardner Plant Unit No. 4, and to replace it with other less carbon-intensive energy resources;

- Reduce fossil fuel use and increase energy efficiency in State Water Project (SWP) operations;

- Reduce energy and water consumption through DWR's statutory and regulatory authority and through disbursement of bond funds; and

- Reduce fossil fuel use in its California Energy Resources Scheduling (CERS) Division contracts and to replace that fuel with less polluting energy resources.

Hydropower is defined as a renewable energy resource, which is specifically, "energy drawn from a source that is infinite or is replenished through natural processes."[1] Over the last 17 years, the SWP has generated clean hydroelectric power for 40 percent to 60 percent of it energy resource needs, depending on precipitation and water demands. In addition to generating its own hydroelectric power, DWR has implemented hydroelectric energy efficiency programs, which result in substantial savings in pumpload requirements.

[1] <http://www.energy.ca.gov/2005publications/CEC-300-2005-010/CEC-300-2005-010-FS.pdf>

Executive Summary

This report is an update on DWR's energy related activities. In summary:

- Carbon dioxide (CO_2) emission levels from SWP operations will meet Assembly Bill (AB) 32's goal of reducing California greenhouse gas (GHG) emissions to 1990 levels by 2020 (12 years early).
- DWR's contract for energy from Reid Gardner expires in 2013. DWR will replace this energy with cleaner resources, substantially reducing the SWP's emissions.
- DWR is preparing a bid request for 2009 for renewable energy for the SWP and partnering with public agencies to solicit new renewable energy contracts.
- In 2007, DWR's participation in California's Demand Response Program resulted in a 3,000 ton reduction of CO_2 emissions, since the program reduces the need to bring the least efficient thermal generators on line during peak hours.[2] In 2008, an estimated 900 tons of CO_2 emissions were avoided.
- Through 2011, by refurbishing or replacing hydroelectric units at SWP facilities, the SWP's energy efficiency programs will save 932,000 megawatt hours (MWh), and 260,000 metric tons (MT) of CO_2 emissions.
- DWR filed its 2007 CO_2 emissions report with the California Climate Action Registry (CCAR) in June 2008. DWR contracted for and retained a CCAR verifier to validate its 2007 emissions inventory by early 2009.
- To determine the rate of land accretion and the potential for carbon sequestration related to farming within the Western Delta, DWR is sponsoring Subsidence Mitigation Rice Cultivation Research and Farm Scale Wetlands Demonstration Projects.[3]
- DWR is applying the Leadership in Energy and Environmental Design (LEED) Gold Standard in its design and construction of a new SWP Area Control Center, located in the SWP's Southern Field Division.
- DWR continues to collaborate with federal and State agencies to increase water use efficiency and thereby reduce GHG emissions related to water use.
- CERS meets 19 percent of investor owned utilities (IOU) customers' electricity demands, with 1 percent renewable, 48 percent natural gas, and 51 percent unspecified energy.

[2] Emissions saved are estimated using the WECC California CO_2 Output Emission Rate published in the U.S. EPA Emissions and Generation Resource Integrated Database (eGRID).
[3] http://www.water.ca.gov/deltainit/docs/Interim-Delta-Actions.pdf

The Department of Water Resources Operations Update

DWR is an agency of the State of California, headquartered in Sacramento, responsible for monitoring, conserving, and developing California's water resources, providing public safety and preventing property damage related to water resources. DWR's mission mandates that all projects undertaken shall benefit the State's people, and to protect, restore, and enhance natural ecosystems and human environments.

DWR continues refining its policies to implement effective measures to address climate change and reduce GHG emissions associated with California's water management objectives. DWR's strategy in managing the SWP incorporates these objectives, as well as meeting regulatory, hydrologic, and environmental requirements.

Continuing dry conditions and court-ordered restrictions on Delta water exports will limit water deliveries for 2009. In October 2008, DWR announced an initial allocation of 15 percent for water delivery to the SWP contractors for 2009,[4] the second lowest in the SWP's history, and is the result of low carryover storage levels in California's major reservoirs, drought conditions, and water delivery restrictions from the Delta.

In October, DWR released "Managing an Uncertain Future, Climate Change Adaptation Strategies for California's Water,"[5] which focuses upon shrinking snowpack, increased flooding, longer droughts, and sea level rise in California. The report recommends an adaptive management approach to preserve statewide water quality and supply, and ensure a healthy ecosystem.

[4] October 30, 2008, http://water.ca.gov/news/

[5] http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf

The California State Water Project

The SWP is the largest State-owned, multi-purpose water project in the country and its operations are critical to the resources and economy of California. The SWP's system spans nearly the entire State, from Lake Oroville in Northern California to Pyramid, Castaic, Silverwood and Perris reservoirs in Southern California. The SWP delivers an average of 3.3 million acre-feet (AF) of water per year to 29 public agency water contractors throughout California. Approximately 40 percent of the deliveries are used to irrigate 750,000 acres of farmland. The remaining deliveries serve the water needs for over 24 million Californians.

The SWP is the third largest generator of clean hydropower in California. Its water conveyance system includes 33 water storage facilities, 700 miles of canals and pipe lines, 20 pumping plants, 4 pumping-generating plants and 5 hydroelectric power plants. The SWP also acquires energy from an off-aqueduct hydroelectric power plant, and an out-of-state thermal power plant. The SWP's power generation sources have over 1,900 MW capacity, and generate an average of 5 billion kilowatt-hours (kWh) of clean hydroelectric energy each year. The SWP's hydroelectric pumping facilities represent approximately 2,600 MW of capacity.

The State Water Project 2007 Energy Portfolio

Bulletin 132, *Management of the California State Water Project*, is a series of annual reports that describe the status of SWP operations and water deliveries. Each annual report updates information regarding project costs and financing, water supply planning, power operations, significant events that affect the management of the SWP, hydrologic information for the water year, fiscal year capital construction information, and water delivery, operations, maintenance, and other activities. The latest updates for the 2007 report are currently underway. Table 1 summarizes the SWP's energy portfolio data for 2007.

Table 1. SWP 2007 Energy Portfolio

SWP 2007 Energy Portfolio	
Source	**GWh**
Hyatt	1,953.7
Thermalito	267.0
Gianelli	261.7
Warne	466.7
Devil Canyon	1,175.2
Castaic	793.1
Alamo	59.1
Mojave Siphon	78.6
Pine Flat	195.9
Small Hydro	145.1
SWP Hydrogeneration	**5,396**
Exchange Agreements	350.6
Market Purchases	4,629.5
Purchases & Exchanges (in)	**4,980**
Reid Gardner Unit No. 4	1,386.6
Reid Gardner Import	**1,387**
Total Resources	***11,763***
Exchange Agreements (Out)	206.1
Market Sales	2,082.8
Sales & Exchanges (out)	**2,289**
Total (Net) Resources	***9,474***

The State Water Project Energy Portfolio – First Two Quarters in 2007 and 2008

Table 2 illustrates the profound impact of regulatory, environmental, and hydrologic conditions, which have reduced the energy resources associated with the SWP. Data for the final two quarters of the 2008 SWP power portfolio will be finalized in early 2009.

Table 2. SWP Energy Portfolio - First Two Quarters of 2007 and 2008

SWP Energy Portfolio Comparison: First and Second Quarters for 2007 and 2008			
% Water Allocated to State Water Contractors	60%	35%	
Hydrologic Condition	Dry	Critical Dry	
Source	**2007 (GWh)**	**2008 (GWh)**	**% Change**
Hyatt Thermalito	1,019.1	528.4	
Gianelli	245.7	101.7	
Warne	267.5	138.8	
Devil Canyon	630.8	384.3	
Castaic	459.7	229.1	
Alamo (Small Hydro)	12.7	38.9	
Mojave Siphon (Small Hydro)	41.3	24.1	
Pine Flat	121.1	177.4	
Small Hydro (MWD)	66.0	72.0	
SWP Hydrogeneration	**2,864**	**1,695**	**-41%**
Exchange Agreements	149.5	80.1	
Market Purchases	4,629.5	1,783.5	
Purchases & Exchanges (in)	**4,779**	**1,864**	**-61%**
Reid Gardner Unit No. 4	687.2	432.0	
Reid Gardner Import	**687**	**432**	**-37%**
Total Resources	**8,330**	**3,991**	**-52%**
Exchange Agreements (Out)	61.5	206.1	
Market Sales	1,976.5	1,003.2	
Sales & Exchanges (out)	**2,038**	**1,209**	**-41%**
Total (Net) Resources	***6,292***	***2,782***	***-56%***

Meeting Assembly Bill 32 Greenhouse Gas Emissions Reduction Goal Early

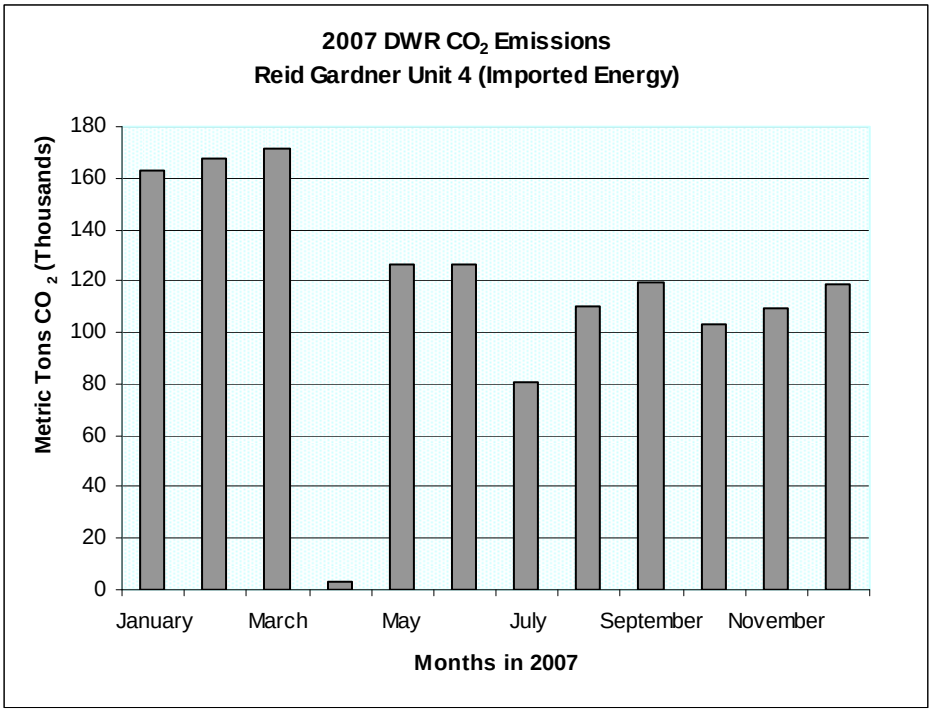
AB 32 sets its first goal to reduce GHG emissions to 1990 levels by the year 2020. The SWP emissions are a direct result of its annual pump load, which is tied to hydrology. As the capacity of the SWP is nearly the same as it was in 1990, and the average pump load over the last five years is less than it was in 1990, the SWP met this goal by 2008.

Phasing Out Reid Gardner Plant – Acquiring Less Carbon-Intensive Energy

The electric power needed to operate the SWP comes from its own and jointly developed hydroelectric facilities, long- and short-term purchase agreements, and a 30 year agreement with Nevada Power Company. Since July 25, 1983, DWR has received up to 235 MW from one of four units at the Reid Gardner coal-fired generation facility located in Moapa, Nevada. In May 2007, DWR formally notified the plant's owner that DWR will not renew this agreement, which expires on July 25, 2013. DWR intends to replace this coal based energy with a combination of cleaner, more efficient resources, improvements to the SWP system, and renewable energy resources.

For 2007, CO_2 emissions measured at Reid Gardner Unit No. 4, disaggregated on a monthly basis, are shown in Figure 1. The drop in emissions for April is due to the plant being taken off-line to perform maintenance and plant improvements.

Figure 1. CO_2 Emissions from SWP Energy Received from Reid Gardner Unit No. 4 in 2007



Based upon the data in Table 1, estimates for the CO_2 emissions for the 2007 SWP portfolio are summarized in Table 3. Consistent with the CCAR protocols, hydroelectric, nuclear, and renewable energy resources are assigned zero carbon emissions factors. Reid Gardner Unit No. 4 CO_2 emissions data was retrieved from the U.S. Department of Energy (DOE) Environmental Protection Agency's (EPA) *Clean Air Markets Database* (CAMD).[6] Emissions for the SWP's purchases and exchanges from unspecified sources are estimated using CCAR 2006 emissions rates reported by its members,[7] direct reporting by counterparties to DWR on their specific emissions rates, and CCAR recommended regional default factors derived from the U.S. DOE EPA[8] *Emissions & Generation Resource Integrated Database* (eGRID).

Table 3. SWP Energy Portfolio CO_2 Emissions in 2007

Estimated 2007 State Water Project CO_2 Emissions		
Portfolio	**Gigawatt Hours**	**CO_2 (Million Metric Tons)**
Energy Resources	11,763	3.31
Sales & Exchanges	2,289	0.28
SWP Operation Totals	**9,474**	**3.03**

In the first half of 2008, the SWP's CO_2 emissions decreased from the first half of 2007 by 35 percent, consistent with diminished water deliveries, drought conditions, and regulatory constraints. Table 4 summarizes the CO_2 emissions attributed to the SWP energy portfolio from the first two quarters in 2007 versus 2008.

[6] <http://camddataandmaps.epa.gov/gdm/>

[7] <http://www.climateregistry.org/CARROT/public/reports.aspx>

[8] Emissions & Generation Resource Integrated Database (eGRID) provides information on the air quality attributes of almost all the electric power generated in the United States. eGRID2006 Version 2.1, April 2007 (year 2004 data), <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>

Table 4. SWP Emissions Reductions from the First Two Quarters in 2007 and 2008

State Water Project CO_2 Emissions First Two Quarters of 2007 and 2008			
Source	**2007 Emissions (MMT CO_2)**	**2008 Emissions (MMT CO_2)**	**% Change**
Reid Gardner Unit No. 4	0.759	0.409	-46%
Market Exchanges	0.047	0.020	-57%
Market Purchases	0.922	0.693	-25%
	1.727	**1.122**	**-35%**

Efficient Energy Technology - Non-Renewable Resources Generation

CO_2 emissions from electric power generation are influenced by the efficiency factors associated with converting fossil fuels into electricity, as well as the type of fuel used. Emissions factors associated with coal-fired generation are almost twice that of natural gas powered generation. In a typical power plant, only 30 percent of the energy is actually converted into electricity. Improvements in generation efficiency by replacing traditional power generators with more efficient technologies can result in lower CO_2 emissions. Consequently, DWR is investigating ownership interest and contractual agreements in technologies such as combined-cycle generation. Energy from combined cycle gas turbines is rated for emissions that average 800 pounds CO_2 per MWh. The first phase of investigations is complete. Final studies include obtaining a plant license from the California Energy Commission for a new state-of-the-art combined-cycle gas plant.

State Water Project System Enhancements - New Small Hydroelectric Generation Capacity

Generation from a small hydroelectric facility that commences commercial operations or is repowered on or after January 1, 2006 is eligible for the California Renewable Portfolio Standard (RPS), if the facility meets all of the following criteria[9]:

- The facility is 30 MW or less, with an exception for eligible efficiency improvements made after January 1, 2008, as discussed below.
- The facility is located in-State or satisfies the out-of-state requirements.

[9] <http://www.energy.ca.gov/2007publications/CEC-300-2007-006/CEC-300-2007-006-ED3-CMF.pdf>, p. 13.

- The facility does not "cause an adverse impact on instream beneficial uses or cause a change in the volume or timing of streamflow."[10]

DWR has entered into Phase II of its East Branch Enlargement Project. This includes the addition of a new small hydroelectric generator at the SWP Alamo Power Plant. The new unit will add 14 MW capacity of small hydrogeneration, which qualifies under California's RPS, and will further reduce the SWP's carbon footprint. Through 2011 DWR will continue its environmental and right-of-way acquisition efforts for this project, as well as develop and refine the unit's design and performance specifications. Final design is expected to be completed in September 2015.

Energy Efficiency Improvements

In 2006, DWR completed the construction of a new reservoir known as the Tehachapi East Afterbay. The Afterbay provides water storage for the SWP's "Valley String" (Dos Amigos, Buena Vista, Teerink, Chrisman, and Edmonston pumping plants). The facility consists of a 910 AF reservoir, inlet channel, outlet channel, bypass, and appurtenant structures.

The new reservoir enables DWR to reduce pumping operations of the Valley String plants during peak energy demand periods, and to provide reliability services to the California electrical grid. The Afterbay provides additional storage capacity by allowing a seasonal reduction in on-peak load, which simultaneously reduces market reliance on poorer quality thermal units that emit higher amounts of GHGs during peak energy demand periods.

DWR is continuing feasibility studies for using renewable technologies such as small hydroelectric, wind energy, and solar projects within its system.

Reducing Fossil Fuel Use and Increasing Energy Efficiency in SWP Operations

The SWP's hydroelectric power generation avoids the large GHG emissions that result from thermal generation. Consistent with the spirit of AB 32 and DWR's mission to enhance California's natural and human environments, DWR conducts multi-faceted engineering studies and programs to improve water-to-energy conversion of all SWP equipment and facilities. DWR's improvement programs include pump and turbine replacements and refurbishments, to ensure that the SWP's hydroelectric units perform at the highest levels of energy efficiency. Major energy efficiency projects have been undertaken at the A.D. Edmonston Pumping and the Edward Hyatt Power plants, resulting in state-of-the-art performance levels exceeding 90 percent efficiency.

[10] Public Utilities Code Section 399.12(c)(1)(A).

In the last report, DWR updated its calculations for the CO_2 emissions reductions associated with the SWP Energy Efficiency programs at Hyatt and Edmonston from 2003 through 2020 using the weighted average of its 2007 emissions rates associated with power purchases and exchanges.

Table 5. SWP Energy Efficiency Savings and Resulting CO_2 Emissions Reductions Years 2003 – 2020

Energy Efficiency Program	Cumulative Energy Savings (megawatt hours)		Cumulative Emissions Reductions (metric tons CO_2)		Equivalent Emissions Savings
Years	Hyatt Generation	Edmonston Pumping	Hyatt Generation	Edmonston Pumping	Automobile Equivalents
2003-2007	306,949	5,951	117,753	2,283	21,985
2008-2020	1,721,443	763,000	660,386	175,297	174,559
Total by Plant	**2,028,392**	**768,951**	**778,139**	**177,580**	**196,543**
CUMULATIVE TOTAL	**2,797 gigawatt hours**		**0.95 million metric tons CO_2**		**196,543 autos**

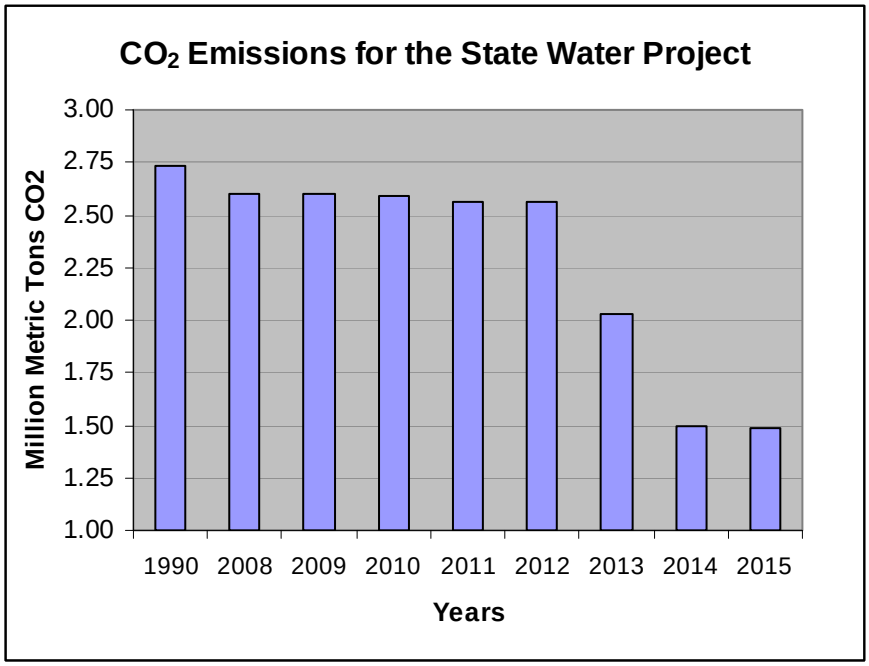
Under Phase II of the East Branch Enlargement program, DWR is studying the feasibility of adding two new hydroelectric pumps at the Pearblossom Pumping Plant. Each new pump would provide 22 MW additional pumping capacity.

The new unit installations are expected to increase energy efficiency by approximately 0.5 percent per pump, and reduce DWR's carbon footprint, since this installation results in less energy required to pump water. The new units will be installed by the close of 2017.

Forecast of SWP Emission Reductions

DWR forecasts a reduction in SWP CO_2 emissions by replacing its coal based energy with resources with lower emissions, increasing its hydrogeneration through energy efficiency projects, and increasing the level of renewable energy resources in its portfolio. DWR expects to reduce emission levels associated with 2008 SWP operations by over one MMT of CO_2 by 2015. This forecast reduction is calculated using parameters associated with the most recent power purchases and sales transactions to a 10-year average hydroelectric generation and pumpload, to account for fluctuating hydrologic conditions from year to year. Forecast CO_2 reductions through the year 2015 are illustrated in Figure 2.

Figure 2. SWP Incremental Forecast CO_2 Emissions Reductions



Reducing Fossil Fuel Use and Increasing Energy Efficiency in SWP Facilities

The U.S. Green Building Council (USGBC) is a 501(c)(3) nonprofit community of leaders that have developed a recognized standard for green building and development. USGBC's LEED Green Building Rating System promotes reliable building design and performance measurement systems.[11] LEED certification provides independent, third-party verification that a building project meets the highest green building and performance measures.

LEED provides a complete framework for meeting sustainability goals and assessing building performance in six categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Innovation and Design Process. LEED certification assigns progressive levels (Certified, Silver, Gold and Platinum) that can be achieved based on the number of points awarded to a building project.

DWR plans to design and construct its new SWP Southern Field Division Area Control Center to meet the requirements for LEED's Gold certification program. As a result, this new facility will:

[11] <http://www.usgbc.org/Docs/LEEDdocs/LEED_RS_v2-1.pdf>

- Lower operating costs
- Reduce waste sent to landfills
- Conserve energy and water
- Reduce harmful GHG emissions
- Demonstrate DWR's commitment to environmental stewardship and social responsibility

DWR is currently engaged in the design review phase of the Project with final design expected to be completed by July 2009 and construction completed in October 2010.

Reducing Energy Use and Water Consumption – DWR's Water Use Efficiency Programs

The Governor has identified conservation as one of the key ways to provide water for Californians and protect and improve the Delta ecosystem. He has directed State agencies to develop and implement a more aggressive plan to help achieve a 20 percent reduction in per capita water use statewide by 2020. This directive builds upon the *California Water Plan Update 2005*, which identified water use efficiency as a "foundational action" for California water management.

To implement this goal, DWR is collaborating with the California Energy Commission, the California Public Utilities Commission, the State Water Resources Control Board, and the Department of Public Health to develop and implement various measures and strategies to increase water use efficiency and thereby reduce GHG emissions related to water use. To support this implementation, this conservation initiative will need to utilize the many Integrated Regional Water Management (IRWM) planning efforts throughout California. During 2008, the five-agency group has been developing information that will form the basis of recommendations to the Governor early in 2009 and will be incorporated into the 2009 California Water Plan Update.

Based on urban water use of about 8.7 MAF per year, attainment of the Governor's target will result in conservation of about 1.76 MAF per year by 2020. This savings will likely be achieved through a combination of more widespread implementation of best management practices for urban water conservation, programs currently under development by State agencies and others, application of State law, and the implementation of new programs not yet developed.

DWR is also working to improve agricultural water management and planning tools such as the California Irrigation Management Information System (CIMIS). DWR expects to develop additional agricultural water conservation programs consistent with its urban conservation target set by the Governor.

The primary benefit of improving water use efficiency is to increase supply reliability by lowering demand and cost-effectively stretching existing water supplies. Another important benefit of improving water use efficiency is based on the relationship between GHG emissions and the use of fossil fuels. This relationship is key to the reduction of GHG emissions through water use efficiency because approximately 19 percent of all electricity and 30 percent of natural gas (non-power plant) are used to convey, treat, distribute, and use water.

Selected programs that are proposed, under development, or in progress to increase conservation include:

- *Best Management Practices (BMPs)* - Promote greater urban water conservation:

  a. Implement Chapter 628, Statutes of 2007, AB 1420, which requires DWR, in consultation with the SWRCB and California Bay-Delta Authority, to develop eligibility requirements urban water suppliers to implement demand management measures (DMM) described in urban water management plans in order to be eligible for specified water management grants and loans. This statute requires DWR to convene an independent panel to provide recommendations to the Legislature on new DMM (conservation) measures, technologies and approaches. This statute also requires DWR to prepare a report to the Legislature that identifies water conservation measures that achieve water savings significantly above DWR conservation levels;

  b. Use incentives (such as access to funding) to promote greater implementation of BMPs; and

  c. Use regulatory tools to ensure greater implementation of BMPs.

- *Appliance Efficiency Standards* - The California Energy Commission will establish and update appliance efficiency standards to conserve water and energy:

  d. Establish efficiency standards for irrigation controllers and spray devices;

  e. Conduct research and demonstration projects that reduce the energy intensity of the water recycling process and improves overall quality;

  f. Establish water conservation and efficiency standards for both buildings and appliances that save both water and energy; and

  g. Conduct research and demonstration projects that explore ways to reduce the energy intensity of the water use cycle and better manage the energy demand of the water system.

- *Landscape Water Conservation* - Promote greater landscape water conservation:

  h. Encourage a systematic approach to low impact development in order to conserve water and energy, improve water quality, reduce the production of green waste, and protect other resources; and

  i. Establish efficiency standards for irrigation controllers and spray devices.

- *Irrigation Efficiency* - Promote greater irrigation efficiency:

  j. Promote more widespread agricultural water management planning;

  k. Establish efficiency standards for irrigation controllers and spray devices;

  l. Update California's model water efficient landscape ordinance; and

  m. Upgrade the California Irrigation Management Information System of automated weather stations.

- *Analytical Tools* - DWR proposes to develop information and analytical tools to better quantify the energy associated with each aspect of water use in each region of California in order to prioritize water use efficiency efforts:

  n. Identify the energy intensity of various water end uses by region in order to prioritize the implementation of water conservation measures. This task involves determining how much embedded energy is required to deliver water to urban end-users and to treat wastewater for multiple utilities in specific regions of the State in order to identify demand-side water-energy efficiency opportunities for the regions.;

  o. Carry out research into the embedded energy required to deliver water to agricultural end users and into the sources of embedded energy in water for each region;

  p. Identify energy efficient urban and agricultural water management opportunities;

  q. Determine the marginal cost per acre-foot of urban and agricultural water by region;

  r. Develop a strategy for potential implementation that includes recycling and brackish-water desalination in areas with high water-energy intensity. Additional research will be required to determine the potential for GHG reductions and the cost effectiveness of specific recycling and brackish water desalination projects;

s. Develop a standardized approach to evaluating how water management actions described in the *California Water Plan Update 2005* impact GHG emissions;

t. Coordinate with the CEC and CPUC on the water-energy connection in the areas of research, planning, and project implementation activities; and

u. Refine the initial targets of GHG reduction.

Reducing Fossil Fuel Use in the CERS Contracts – Replacement with Less Polluting Energy Resources

As CERS no longer has the authority to enter into new contracts, this portion of the report has remained unchanged from the January 2008 report.

DWR created the CERS Division during California's 2000-2001 energy crisis in response to calls by the Governor and the Legislature for DWR to purchase power for California's IOUs. In 2001, the CERS Division of the DWR assembled a portfolio of long-term energy contracts that achieved the directive of the Governor and Legislature to provide reliable electric service at the lowest-possible price. On behalf of the State, DWR entered into power contracts for 20 percent of the power used by IOU's. These power contracts provided the guaranteed revenue that allowed for the financing and construction of over 5,000 MW of state-of-the-art natural gas-fired power plants. These cleaner, more fuel efficient natural gas-fired power plants have significantly reduced reliance on older, less-efficient plants in the State.

DWR originally entered into contracts with 28 counterparties to provide 56 energy products. Six of the agreements were for renewable power, and included two contracts totaling 31 MW for biomass power, one 25 MW contract for geothermal power, and three contracts for a total of 174 MW of wind power.

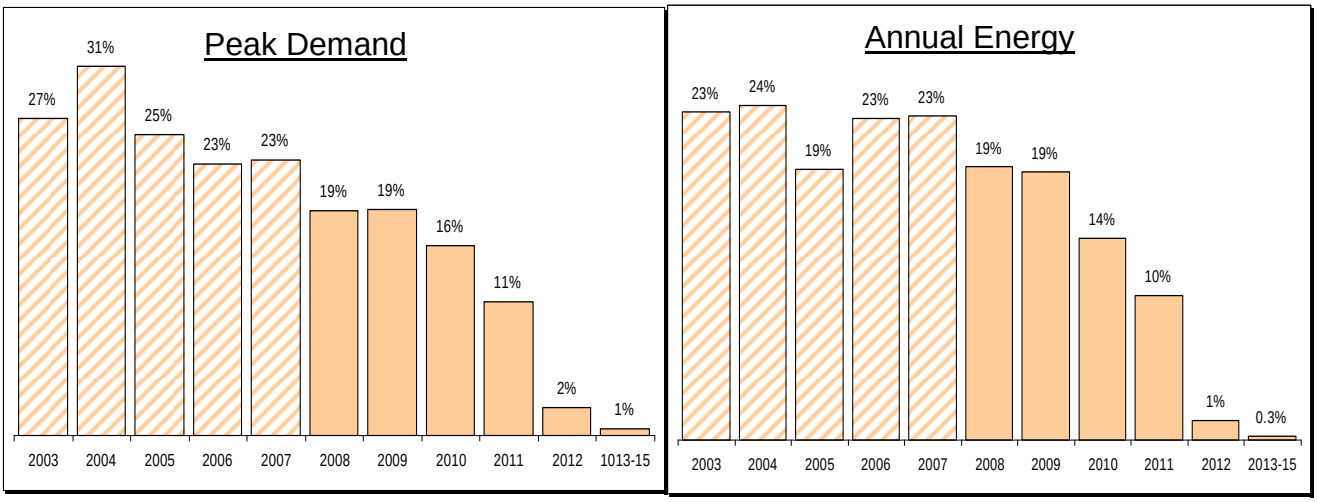
The contracts also provided a guaranteed source of revenue that allowed DWR's counterparties to secure financing for the construction of over 5,000 MW of new energy-efficient gas-fired power plants that were built between 2001 and 2003. These new generation plants displaced power from older, dirtier, less efficient fossil generation in the State and have contributed to a reduction in carbon emissions of approximately 1.66 million tons annually.

The Legislature required DWR to consider a number of factors when entering into contracts for power, including an intent to achieve an overall portfolio of energy contracts offering reliable service at the lowest possible price to secure as much power under contract as possible from firm and non-firm renewable energy resources. Reliable, reasonably-priced electricity is essential to the safety, health and well-being of the people of California. As opportunities for contract amendments arise, DWR strongly

encourages energy portfolio options that contribute increasing percentages of renewable energy resources to its energy mix portfolio, consistent with the Legislature's intent.

Nearly seven years after the energy crisis, DWR continues to provide electricity that meets nearly 20 percent of the IOU customers' electricity demands. Twenty-six contracts remain in effect with an estimated cost of $12.5 billion. By 2012, only four contracts will remain providing less than one percent of the IOU's customers' demand. The last contract expires in 2015, as illustrated in Figure 3.

Figure 3. CERS Contracts as a Percent of IOU Peak Capacity & Annual Energy Demand



The Generation Mix of the CERS Portfolio

For 2007, the estimated mix of generation from the CERS portfolio was:

Table 6. CERS Generation Energy Portfolio in 2007

Source	Capacity (MW)	Energy (GWh)
Wind	64	429
Natural Gas	7,782	35,778
Non-Specific	2,719	18,790
Total	**10,565**	**54,997**

While most of the generation in the DWR portfolio comes from newly constructed, energy efficient, natural gas-fired plants, some of the DWR contracts are with power marketers who do not own any generation, or with counterparties that have the option to

provide power from market sources when it is cheaper to do so. Roughly 34 percent of the power provided comes from non-specific market sources, which can not be traced back to a specific generator.

For 2008, CERS division contracts are forecasted to provide 19 percent of the State's IOUs annual demand for electricity. Electricity from CERS contracts with renewable energy resources will provide 1 percent of the CERS total, while electricity generated from natural gas facilities is estimated to provide 48 percent. The remaining 51 percent will come from the general market where the source of the generation is not known. Between now and when the CERS contracts end in 2015, DWR will have the limited opportunity to re-negotiate the contracts to increase the amount of electricity derived from renewable energy resources.

Role in Statewide Energy Supply

DWR's authority to enter into new contracts ended in 2002. Its temporary role in providing power limits its ability to renegotiate contracts to bring **new** renewable energy projects on-line. Developers of new renewable energy projects need long-term contracts in order to get financing for the projects.

For DWR to replace fossil generation in the portfolio of contracts with renewable energy, and still limit its involvement in energy markets to no longer than 2015, would require DWR to compete against the California IOUs for power from existing renewable energy projects. This would only exacerbate the problem the IOUs are currently facing in meeting the State's renewable portfolio standard goal.

Due to the unique circumstances of the CERS contracts and limitations on contract term-renegotiation, it is unlikely that fossil fuel use in the portfolio of CERS will be appreciably reduced.